

ESG – Under the hood

Semiconductors: How incentives are changing the investment landscape

- ◆ Tech companies are planning for net zero, more sustainable and localised supply chains, and strong chip demand ...
- ◆ ... which requires strategic capital and supply chain management, especially as industry capex is rising sharply
- ◆ In an increasingly complex landscape, we think governance decisions on capital allocation will drive shareholder returns

This is the second in our series looking at a single sector and related company-level ESG issues, detailing how we integrate these into our financials, valuations, and risks.

TSMC has identified a 15-20% revenue opportunity in low carbon products. We find TSMC has made a detailed analysis of its risks and opportunities from climate change. The company identified 15-20% incremental revenue opportunities, but more modest cost increments of just 1-2%. Some of this revenue and cost was incorporated into our ESG Integrated 2 series and other company updates.

Accelerating supply chain sustainability in fast-growing markets. Investment priorities include capacity expansions, renewable energy, and circular systems for water, materials and waste reduction. We think changes such as reshoring incentives and trade restrictions are likely to have a big impact on future performance.

Investment boom ahead. The Semiconductor Industry Association (SIA) expects USD3trn in capital spending over the next 10 years, to meet rising demand for leading-edge and advanced chip designs. This surge in capex comes even as chip prices have dropped sharply, affecting cash flow and earnings and weighing on share prices. Our tech team anticipated this risk, but also has published a sense of what investors are thinking after meeting with corporates and clients over the last six weeks.

Governance in spotlight amid changing regulatory, tax and trade landscape. To facilitate reshoring, governments are offering incentives in the form of land, loans, labour, tax holidays, tax credits and other subsidies in order to equalise the total cost of ownership on new investment. We focus on six companies in the full note and, longer term, think shareholder returns could improve given generous incentive frameworks and strong demand. This seems to be the opinion of one large US investor, who purchased a USD5bn stake in TSMC (see *Bloomberg*, "Buffett Takes \$5 Billion Stake in TSMC, Sparking Surge in Shares", 15 November 2022).

This is a redacted version of a report with the same title published on 16-Dec-22. Please contact your HSBC representative or email AskResearch@hsbc.com for more information or to request reports mentioned above.

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Integrating ESG: Our analytical approach

Stages of ESG integration

Identify ESG issues relevant to a sector (locally, regionally, globally)

1 Identify issues

Understand how the issues affect / are affected by various sectors

Determine whether the ESG issue is a risk / opportunity for the company

2 Apply to company

Consider how well the company has addressed the issue over varying time horizons

Make adjustments to valuations, ratings, and target prices accordingly

3 Integrate into financials

Adjust cash flows (revenues, costs), weight average cost of capital or multiple

How is ESG “priced in” to stock valuation?



Corporate performance

Business perspective – over time, the operational performance of a business improves because it manages various ESG issues well



Stock valuation

Investor perspective – investors (and analysts) consider how well the business is dealing with ESG-related risks and opportunities and how this relates to the current market value



Reputation perception

General public perspective – a shock (usually negative) which may arise as a result of a publicly reported negative ESG-related incident such as an environmental violation or a major governance failing

How do ESG issues affect companies?

ESG matters can be morphed into business opportunities which generate new streams of income.

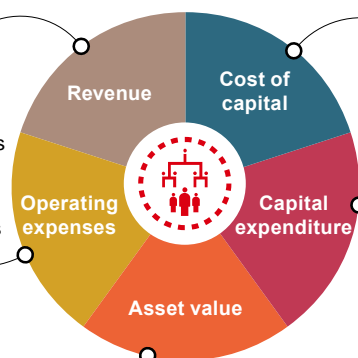
Example: Decarbonisation provides more business opportunities for the renewable energy value chain.

ESG issues can impact the operating cost of companies through efficiency enhancement and regulations.

Example: Increase in insurance costs for food delivery companies due to growing awareness of workers' rights and tightening regulations.

ESG factors may affect anticipated cash flows from company assets and thus the net present value.

Example: Fossil fuel assets of energy companies may be stranded or impaired long-term through energy transition.



Investors may require higher risk premiums for companies with poor ESG disclosures and practices. Green projects can enjoy more favourable rates in financing.

Example: Some central banks are providing lower-interest-rate loans to fund green projects.

The transition to a sustainable economy is likely to bring changes in capital expenditure for development and investment in more sustainable activities.

Example: Technology companies allocate capital, which enables them (and others) to be more sustainable.

Source: HSBC

Under the hood

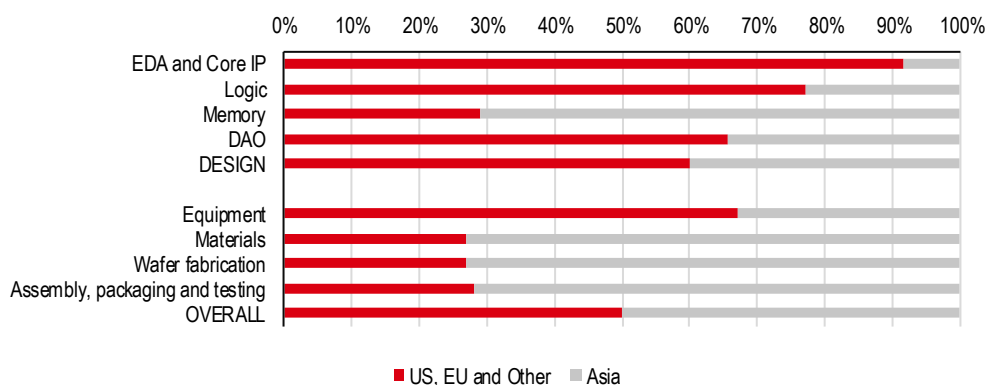
- ◆ The semiconductor industry is entering a new investment cycle to localise a more sustainable supply chain and meet future demand
- ◆ Policy incentives across the world support record levels of capital spending over 2021-25e, despite relatively weak chip pricing
- ◆ The significant uptick in capital spending raises risks, but incentives have the potential to boost long-term shareholder returns

How ESG is shaking up the chip industry

The semiconductor industry is in a period of robust investment expansion driven by two key factors: 1) concerns about supply chain security, which is leading to a relocation of chip production capacity and supply chain infrastructure; and 2) proliferation of chips into an increasing number of products which is driving up demand, especially for advanced and leading edge chips. We believe this has broad implications for the industry's future growth and returns. As the capacity footprint grows in developed markets, this will also drive important trends in corporate sustainability efforts.

Interruptions to normal trade flows of semiconductors, intermediate and finished technology products during the pandemic accelerated the development of government policies designed to localise the supply chain. While design, logic and equipment manufacturing are concentrated in the US, the majority of material, wafer fabrication and assembly packaging and testing occurs in Japan, Korea and Taiwan (East Asia) and mainland China.

Semi-conductor supply chain, 2021

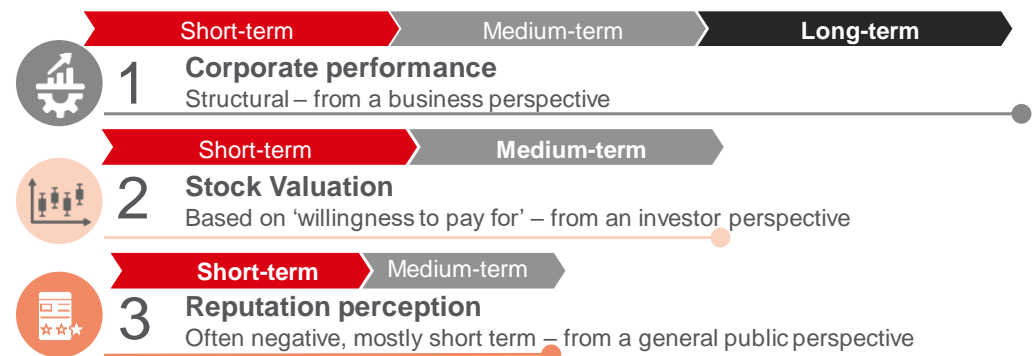


Source: Semiconductor Industry Association

Time horizons for ESG and sustainability impact on share price, valuation and reputation.

In our evaluations of risk and opportunity transmission, we consider the impact of ESG/sustainability issues on three key areas: corporate performance, stock valuations and reputation perception. In this note, we are particularly focused on factors influencing corporate performance over the medium and long term.

ESG and sustainability risk and opportunity transmission



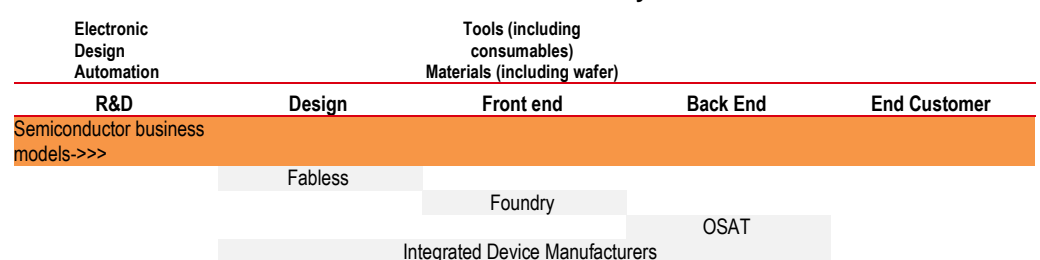
Source: HSBC

Medium and long term corporate performance is likely to be driven by **(1)** technology decisions, **(2)** the rate of advanced and leading edge chip penetration and **(3)** the returns on investment in supply chain sustainability (including decarbonization) and localization.

TSMC's analysis shows that environmental considerations, including climate change and decarbonization bring both opportunities and costs, but that the opportunity is likely to produce a bigger impact on medium and long term financial performance.

The location of new foundry and testing capacity has a big impact on capital costs, total cost of ownership (TCO) and returns to shareholders. But these inputs and outcomes are potentially being significantly altered by a complex framework of investment incentives across markets.

The semiconductor stack is embedded in a wider ecosystem



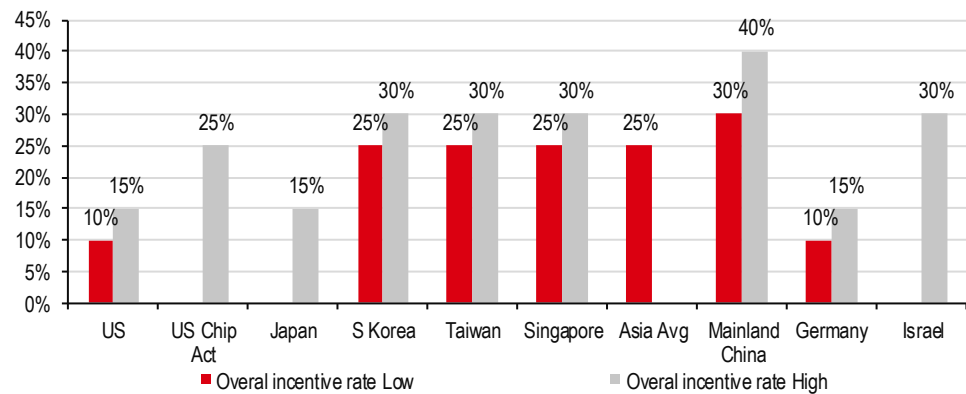
Source: Europe's Urgent Need to Invest in a Leading-Edge Semiconductor Ecosystem. Copyright A.T. Kearney, 2021. All rights reserved. Reproduced with permission.

The Semiconductor Industry Association (SIA) assesses the industry outlook, risks and challenges in an annual report. In their latest report of November 2022, they estimate that this complex semiconductor supply chain as it exists now, compared to fully localised "self-sufficient" supply chains, has yield savings in capital investment (USD1trn), produces annual cost efficiencies (USD45bn-100bn) and results in lower average semiconductor chip prices (35-65%).

The SIA also estimates that USD3trn will be spent over the next 10 years on semiconductor capital expenditure and research and development (R&D), a large amount of which will be invested in the US and Europe to localise chip supplies.

Without substantial policy incentives, the TCO of chip manufacturing in the US and Europe is prohibitively higher than in Asia. This is why US policy makers have moved aggressively to levelise TCOs by creating incentives through an USD80bn program and also why the EU is also considering a new plan of incentives estimated at USD50bn. The new investment tax credits in the US help levelise the TCO by equalizing incentives with Asian countries, outside mainland China, which has some of the most generous incentives in its own attempt to develop its domestic semiconductor industry.

Comparison of government incentives across locations, as of 2020

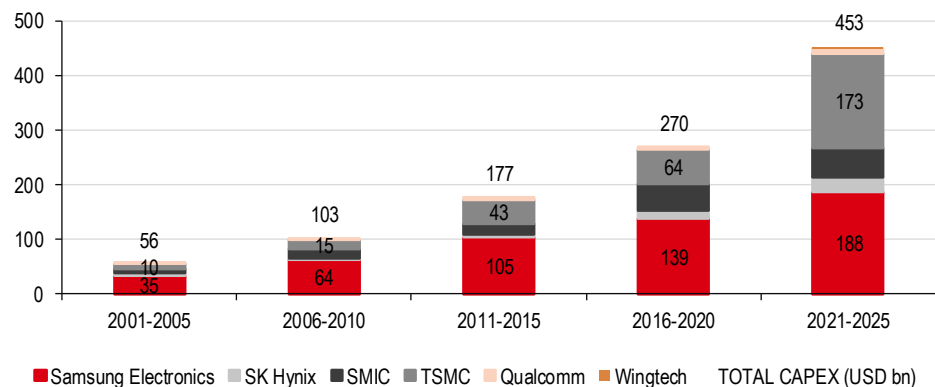


Source: SIA-2022-Factbook_May-2022

Capital spending surge and redirection. According to the SIA, capital spending and R&D investment in the global sector tend to be relatively stable through the cycle at around 25-35% of sales.

Consensus forecasts for capital spending of the six companies covered in the full report suggest an increase in capital spending of nearly 70% over the 2021-25e period compared to the previous five-year period, to cUSD450 (from USD240bn). This is being led by a 175% increase in TSMC's forecast five-year capex to over USD170bn, and a more modest 35% increase for Samsung Electronics. Given the sharp expected expansion of advanced and leading edge chip demand, we expect that over the cycle, capex targets could be maintained, although there could be some variability from year to year. To reinforce the trend seen in the consensus numbers, HSBC forecasts are even slightly higher than consensus over the forecast horizon, although we note there has been some scaling back of capex in 2022e, due to uncertainty on demand and weaker than expected cash flows.

Capital spending cycle, 2001-25e (USDm)



Source: Bloomberg

Supporting these expenditures is the recent passage of the US CHIPS Act, which provides incentives to companies for investment into the sector in the US. But complicating the future product flows are new restrictions on US exports of advanced integrated circuit (IC) products, related manufacturing equipment and technology, and supercomputers, where the destination or ultimate end use is in mainland China.

Reputation perception. In general, semiconductor industry participants have good reputations and while resource consumption, emissions, water consumption and waste are always in focus, there have been few major reputational issues affecting share prices in the sector. Recall that when industrial accidents or other corporate reputational issues do emerge, they are usually negative in context and often have an immediate knock-on effect on share prices.

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The full note also includes: financial opportunities and risks from climate change; resource intensity; social integration frameworks; supply chain concerns; policy answers to level the cost of ownership; and company updates on Samsung Electronics, SK Hynix, SMIC, TSMC, Qualcomm and Wingtech.

Disclosure appendix

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